Neftyanoe Khozyaystvo - Oil Industry 2017 N2, pages 46-48

The Tournesian reservoir limestones on core petrophysical and geochemical data (Southern slope of South-Tatarian Arc)

Nurgalieva N., Anikina E., Khassanova N.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

This paper presents core data on the composition and reservoir properties of the Tourneisian carbonate rocks in typical well section on the southern slope of South-Tatarian Arc. The core data include structures, minerals, reservoir properties measurements from previous studies and geochemical signs, just received by method of electron spin resonance (ESR). Investigated interval of 12 m thickness belongs to an upper part of the Tourneisian stage. It is composed of two layers: upper grainstone layer (5 m) and lower packstone layer (7 m). The granulated fossils predominate in the studied limestones. A porous space is controlled by primary structures and also by leaching processes, a secondary calcite mineralization and stylolites. ESR data have been obtained on 21 samples collected with a step 0.4-0.6 m along the section. ESR spectra are characterized by narrow lines, pointing on a marine genesis of the carbonates. Paramagnetic centers of Mn 2+ and SO 2- have been observed as typical features of the rocks due by primary processes of carbonate sedimentation. A spatial distribution of limestones types, its geochemical and reservoir signatures is explained by the sedimentary succession of progradation type. The calcite mineralization and a distribution of Mn 2+ and SO 2- paramagnetic ions have been determined along the section profile simultaneously with reservoir zoning due by facies and a history of hydrocarbons.

Keywords

Geochemical labels alternation, Grainstones, Progradation, Tournesian oil saturated limestones

References

[1] Nurgalieva N.G., Microfacies, petrophysics and sequence-stratigraphic frame of carbonate reservoir rocks of Kizelovskian formation (In Russ.), Neftyanoe khozyaystvo = Oil Industry, 2012, no. 3, pp. 38-40.

[2] Nurgalieva N.G., Smelkov V.M., Kal'cheva A.V., Lithological and petrophysical features of Famenian and Tournesian carbonate reservoir rocks (In Russ.), Neft'. Gaz. Novatsii, 2013, no. 4, pp. 38-44.

[3] Nurgalieva N.D., Nurgalieva N.G., Cluster Image Processing technique for porosity estimation of carbonate rocks, ARPN JEAS, 2015, V. 10, no. 4, pp. 1668-1671.

[4] Nurgalieva N.D., Nurgalieva N.G., Porosity estimation of carbonate rocks with Multispec processing technique, ARPN JEAS, 2014, no. 1, pp. 20-24.

[5] Evdokimov S.A., Nurgalieva N.G., Kadyrov R.I., Evdokimova E.A., Some modern methods of the pore space studying in the carboniferous carbonate rocks, 75th EAGE Conference & Exhibition incorporating SPE EUROPEC 2013 Session: Carbonate Depositional Environments & diagenesis. 10 June 2013 - DOI: 10.3997/2214 - 4609.20130687.

[6] Geologicheskoe stroenie i neftegazonosnost' Orenburgskoy oblasti (Geology and oil and gas potential of Orenburg region), Orenburg: Orenburg Publishing House, 1997, 272 p.

[7] Dunham R.J., Classification of carbonate rocks according to depositional texture, In: Classification of carbonate rocks according to depositional texture. In: Classification of carbonate rocks - a symposium, AAPG Mem., 1962, no. 1, pp. 108-121.

[8] Lucia F.J., Rock fabric/petrophysical classification of carbonate pore space for reservoir characterization, AAPG Bulletin, 1995, V. 79, no. 9, pp. 1275-1300.

[9] Bulka G.R., Nizamutdinov N.M., Mukhutdinova N.G. et al., ESR probes in sedimentary rocks: the features of Mn2+ and free radicals distribution in the Permian formation in Tatarstan, Applied Magnetic Resonance, 1991, V. 2, no. 1, pp. 107-115.

[10] Nurgalieva N.G., Galeev A.A., Issledovanie porod metodom ESR (Research of rocks by ESR method), Collected papers "Stratotipicheskiy razrez tatarskogo yarusa na reke Vyatke" (Stratigraphic section of Tatarian stage on the Vyatka River), Moscow: GEOS Publ., 2001, pp. 56-68.

[11] Nurgalieva N.G., Khasanova N.M., Gabdrakhmanov R.R., Conditions of formation of Urzhum stage deposits on ESR data (In Russ.), Uchenye zapiski Kazanskogo universiteta. Ser. Estestvennye nauki, 2010, V. 152, no. 1, pp. 226-234.

[12] Fakhrutdinov E.I., Nurgalieva N.G., Khasanova N.M., Silant'ev V.V., The Lower Kazanian substage in the key section: lithologies and paleoenvironments based on the ESR data (In Russ.), Uchenye zapiski Kazanskogo universiteta, 2015, V. 157, no. 3, pp. 87-101.